

CLAIMS

1. Device assisting an aircraft to intercept a segment (S3) of a flight path (T) located in a horizontal plane, said device (1) being carried on the aircraft and including:

– initial means (4) to determine the aircraft parameter values; and

5 – initial means of display (6) to present, on at least one display screen (6):

. at least one said flight path segment (S3) in the horizontal plane to be intercepted; and

. an initial symbol (7) illustrating the position of the aircraft in the horizontal plane with respect to said flight path (T),

characterized in that said first means (4) determine at least one ground speed vector representative of the aircraft speed with respect to the ground, and in that said first means of display (5) are liable to present, in addition, on said display screen (6):

- a first means of indication (10) of the ground speed corresponding to the first rectilinear section (11) in said horizontal plane connected to said first symbol (7), whose angular orientation corresponds to the direction of said ground speed vector, and whose length:

15 . is proportional to the ground speed vector module, when said ground speed is greater than a predetermined value; and

. is fixed and proportional to the module of said predetermined value when said ground speed is less than or equal to said predetermined value;

- a second interception approach means of indication (12) corresponding to a second rectilinear section (13) in said horizontal plane in the direction of said flight path segment (S3) to be intercepted and whose length is adjusted automatically so that said second rectilinear section (13) extends at one of its ends, said first rectilinear section (11) and, at the other of its ends, a third means of indication (14); and

20 . said third means of indication (14) for the interception turn, corresponding to a portion of the curve comprising at least a circle arc (15, 15A, 15B) in said horizontal plane, one end of said curve portion extending at a tangent said second rectilinear section (13), and at the other end, connecting at a tangent to said flight path segment (S3) to be intercepted.

2. A device according to claim 1;

30 characterized in that said first means of display (5) present second means of indication (12) on said display screen (6) only:

– if a segment (S3) of flight path (T) is in the direction of said first rectilinear section (11) of first means of indication (10); and

– if this segment (S3) is situated at a distance less than a predetermined distance with respect to first said rectilinear section (11).

35 3. A device according to one of claims 1 and 2,

characterized in that said circle arc (15, 15A, 15B) of third means of indication (14) has a radius (R) depending on the speed of the aircraft.

4. A device according to one of claims 1 to 3,  
characterized in that said circle arc (15, 15A, 15B) of the third means of indication (14)  
5 includes a radius depending on the aircraft capacities.

5. A device according to one of claims 1 to 4  
characterized in that said circle arc (15, 15A, 15B) of the third means of indication (14) may  
be deformed to take into consideration the intensity and direction of the wind.

6. A device according to any of the previous claims,  
10 characterized in that said first means of display (5) present said third means of indication  
(14) on said display screen (6) only:

- if a segment (S3) of flight path (T) is in the direction of said second rectilinear section (13)  
of the second means of indication (12);
- if this segment (S3) is at a distance that is less than a predetermined distance with  
15 respect to said second rectilinear section (13); and
- if the demands of the flight plan make an interception maneuver possible.

7. A device according to any of the previous claims  
characterized in that it includes, in addition, second means (16) for detecting an obstacle,  
and in that said first means of display (15) are liable to present, also on display screen (6), at  
20 least a second symbol (17) illustrating the position of said obstacle in said horizontal plane.

8. A system for assisting the interception and follow-up by an aircraft of a flight path  
segment located in a horizontal plane,  
characterized in that it is carried on the aircraft and includes:  
– a device (1) assisting with interception such as specified in any of claims 1 to 7; and  
25 – a device (3) for following up the flight path.

9. A system according to claim 8,  
characterized in that said device (3) assisting with the follow-up of a flight path includes:  
– third means (18) for determining a lateral deviation of the aircraft with respect to a flight  
path segment in the horizontal plane, and lateral margins tolerated either side of said  
30 flight path segment in the horizontal plane; and  
– second means of display (5) liable to present, on a display screen (6):  
    . a lateral deviation fixed scale (20);  
    . a fourth effective lateral deviation means of indication (22) corresponding to a straight  
segment (23) provided for on said scale (20) and illustrating the effective lateral  
35 deviation of the aircraft from the flight path segment (S3) to be followed; and

a fifth means of indication (24) for excessive lateral deviation appearing on said scale when the aircraft approaches at a predetermined distance of said lateral margins.

10. A system according to claim 9,  
characterized in that said fixed scale (20) has a constant size in all the aircraft flight phases  
5 thanks to the automatic adjustment of the proportion between the real distances and their representation on display screen (6).

11. A system according to either of claims 9 and 10,  
characterized in that said straight segment (23) of said fourth means of indication (22) may be inclined.

10 12. A system according to any of claims 9 to 11,  
characterized in that said fourth means of indication (22) changes shape when reaching its limit.

13. A system according to any of claims 9 to 12,  
characterized in that said fifth means of indication (24) is flashing.

15 14. A system according to any of claims 9 to 13, to assist with the interception and follow-up of a flight path (T) including a multitude of segments (S1, S2, S3, S4),  
characterized in that said second means of display (5) also present, on said display screen (6), a sixth means of indicating a change of flight path segment to follow.

15. A system according to any of claims 9 to 14,  
20 characterized in that second means of display (5) present, in addition on said display screen (6), a seventh means of indication (28) of the lateral speed tendency.

16. A system according to any of claims 9 to 15,  
characterized in that said first means of display (5) of device (1) assisting with interception and said second means of display (5) of device (3) assisting with follow-up are part of one  
25 and the same display unit (5).

17. A system according to any of claims 9 to 16,  
characterized in that it also includes means of transmitting information (37) liable to connect both said first means (4) of said device (1) assisting with interception and said third means (18) of said device (3) of follow-up assistance to an autopilot (36) on the aircraft for the  
30 transmission of information.